WHAT IS CLAIMED IS:

1. An optical disk reproducing apparatus including: a spindle motor configured to rotate an optical disk; an optical pickup configured to emit a laser beam onto the optical disk and to receive light reflected from the optical disk for reproducing information recorded on the optical disk; and a spindle motor controller configured to control the spindle motor on the basis of a synchronization signal contained in a reproduction signal output from the optical pickup in a reproduction process, the apparatus comprising:

a braking control circuit which comprises:

a first frequency measuring section configured to measure a frequency of a read clock signal that is synchronized with an RF signal corresponding to the reproduction signal, as a first frequency in a process of braking the spindle motor;

a first brake signal outputting section configured to output a brake signal for applying a brake to the spindle motor for a predetermined time, after the first frequency is measured;

a second frequency measuring section configured to measure the frequency of the read clock signal after the brake is applied for the predetermined time, as a second frequency;

a frequency difference determining section configured to determine whether or not a frequency difference obtained by subtracting the second frequency from the first frequency is equal to or larger than a first threshold and equal to or smaller than a second threshold;

a braking time calculating section configured to calculate a braking time from an expression of {the first frequency / (the first frequency - the second frequency)} * (a measuring time from a timing when the first frequency is measured to a timing when the second frequency is measured), in a case where determined that the frequency difference is equal to or larger than the first threshold and equal to or smaller than the second threshold;

a servo-off section configured to turn off a servo system of the spindle motor, after the braking time is calculated;

a second brake signal outputting section configured to output a brake signal to the spindle motor for the calculated braking time, after the servo system is turned off;

a first braking voltage setting section configured to set a braking voltage to a higher level and returns a control to a process of the first frequency measuring section, in a case where determined that the frequency difference is smaller than the first threshold; and

a second braking voltage setting section configured to set the braking voltage to a lower level and returns the control to the process of the first frequency measuring section, in a case where determined that the frequency difference is larger than the second threshold.

2. An optical disk reproducing apparatus including: a spindle motor configured to rotate an optical disk; an optical pickup configured to emit a laser beam onto the optical disk and to receive light reflected from the optical disk for reproducing information recorded on the optical disk; and a spindle motor controller configured to control the spindle motor on the basis of a synchronization signal contained in a reproduction signal output from the optical pickup in a reproduction process, the apparatus comprising:

a braking control circuit configured to measure a frequency of a read clock signal that is synchronized with an RF signal corresponding to the reproduction signal, as a first frequency in a process of braking the spindle motor; to measure the frequency of the read clock signal after a brake is applied to the spindle motor for a predetermined time after the first frequency is measured, as a second frequency; to calculate a braking time on the basis of a frequency difference obtained by subtracting the second frequency from the first frequency, the first frequency

and a measuring time from a timing when the first frequency is measured to a timing when the second frequency is measured; and, after the braking time is calculated, to turn off a servo system of the spindle motor and to output a brake signal to the spindle motor for the calculated braking time.

3. The optical disk reproducing apparatus as claimed in claim 2, wherein the braking control circuit comprises:

a first frequency measuring section configured to measure the frequency of the read clock signal that is synchronized with the RF signal corresponding to the reproduction signal, as the first frequency in the process of braking the spindle motor;

a first brake signal outputting section configured to output the brake signal for applying a brake to the spindle motor for the predetermined time, after the first frequency is measured;

a second frequency measuring section configured to measure the frequency of the read clock signal after the brake is applied for the predetermined time, as a second frequency;

a frequency difference determining section configured to determine whether or not the frequency difference obtained by subtracting the second frequency from the first frequency is equal to or larger than a first

threshold and equal to or smaller than a second threshold;

a braking time calculating section configured to calculate the braking time from an expression of {the first frequency / (the first frequency - the second frequency)} * (the measuring time from a timing when the first frequency is measured to a timing when the second frequency is measured), in a case where determined that the frequency difference is equal to or larger than the first threshold and equal to or smaller than the second threshold;

a servo-off section configured to turn off the servo system of the spindle motor, after the braking time is calculated; and

a second brake signal outputting section configured to output the brake signal to the spindle motor for the calculated braking time, after the servo system is turned off.

4. The optical disk reproducing apparatus as claimed in claim 3, wherein the braking control circuit further comprises a first braking voltage setting section configured to set a braking voltage to a higher level and returns a control to a process of the first frequency measuring section, in a case where determined that the frequency difference is smaller than the first threshold.

5. The optical disk reproducing apparatus as claimed in claim 3, wherein the braking control circuit further

comprises a second braking voltage setting section configured to set a braking voltage to a lower level and returns the control to the process of the first frequency measuring section, in a case where determined that the frequency difference is larger than the second threshold.

6. A method for controlling a spindle motor in which rotates an optical disk, comprising:

measuring a frequency of a read clock signal that is synchronized with an RF signal corresponding to a reproduction signal obtained by reproducing the optical disk, as a first frequency in a process of braking the spindle motor;

outputting a brake signal for applying a brake to the spindle motor for a predetermined time, after the first frequency is measured;

measuring the frequency of the read clock signal after the brake is applied for the predetermined time, as a second frequency;

determining whether or not a frequency difference obtained by subtracting the second frequency from the first frequency is equal to or larger than a first threshold and equal to or smaller than a second threshold;

calculating a braking time from an expression of {the first frequency / (the first frequency - the second frequency)} * (a measuring time from a timing when the first

frequency is measured to a timing when the second frequency is measured), in a case where determined that the frequency difference is equal to or larger than the first threshold and equal to or smaller than the second threshold;

turning off a servo system of the spindle motor, after the braking time is calculated; and

outputting the brake signal to the spindle motor for the calculated braking time, after the servo system is turned off.

7. The method as claimed in claim 6 further comprising setting a braking voltage to a higher level and returns to the measuring of the first frequency, in a case where determined that the frequency difference is smaller than the first threshold.

8. The method as claimed in claim 6 further comprising setting a braking voltage to a lower level and returns to the measuring of the first frequency, in a case where determined that the frequency difference is larger than the second threshold.